

AN IMPACT OF TANNERY EFFLUENTS AMONG RICE GROWERS IN VELLORE DISTRICT

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ABSTRACT

Tannery industry has become one of the major water consuming industries responsible for water pollution problems of considerable magnitude. The use of tannery effluent contaminates water for agricultural purpose had impacted rice growers in large scale. The present study has been conducted among rice growers in Walajapet block of Vellore district. A sample of 110 paddy farmers was selected using a proportionate random sampling method for the study. Ex-post facto research design has been used in this study. Results reveal that increased soil salinity, depleted soil nutrients, frequent pest and disease outbreak, increased cost of cultivation were the impacts faced by the paddy farmers.

KEYWORDS: Tannery Effluents, Impact & Rice Growers

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INTRODUCTION

Since ancient times, tanning activities were organized to meet the local demands of leather footwear, drums and musical instruments in small scale. But in the meanwhile to meet out the leather demands of growing population, large scale commercial tanneries have been established. Despite its contribution to the mankind, the tannery industry become one of the major water consuming industries responsible for water pollution problems of considerable magnitude. Leather processing involves a series of unit operations including pre-tanning, tanning and post-tanning / finishing.

So, excessive amounts of chemicals are used for processing operations. It has been reported that 50% of the chemicals used in these processes become wastewater or sludge. These tannery wastewater was highly polluted with suspended solids, nitrogen, conductivity, sulphate, sulphide, chloride, Biological Oxygen Demand, Chemical Oxygen Demand and chromium. A significant quantity of tannery wastewater released from tiny units combines with domestic waste-water into the river. This depletes the dissolved oxygen present and affects the aquatic life in the river. Simultaneously, the aesthetics of the river make it unsuitable for considering it as a source of drinking water supply.

Similarly, Karthikeyan *et al.*, (2009) found that the industrial effluents consist of organic compounds along with inorganic complexes and other non-biodegradable substances. These pollutants not only alter the quality of ground water and soil but also pose serious problems.

Further the use of contaminated water for agriculture had impacted farmers at a larger scale. Among other agricultural crops, its impact on rice farmers is apparent as rice being a high water consuming crop.

In this line Madhav (2008) opined that the groundwater quality around the cluster of bleaching and dyeing units is heavily polluted and is regarded as unfit for domestic, industrial and agricultural activities.

In this study Balakrishnan *et al.*, (2008) proclaimed that groundwater quality in this vicinity has resulted in damage to agricultural crops and cause skin disorder due to dyeing industrial effluents.

Against this background, the present study was conducted among rice farmers to identify the impact of tannery effluents. A thorough analysis would help to come out with many policy implications.

MATERIALS AND METHODS

For the present study, Walajapet block of Vellore District of Tamil Nadu has been purposively selected for the following reasons: 1) as Vellore district has the major tannery clusters, 2) out of fourteen Common Effluent Treatment Plants (CETPs) in Tamil Nadu for tannery effluent, ten CETPs are located at Vellore District. This signifies the prevalence of effects of tannery effluents among the habitants of the study area.

A sample of 110 paddy farmers were selected using the proportionate random sampling method. Ex-post facto research design has been used in this study. Data were collected by using well-structured and standardized interview schedule. Cumulative frequency analysis was used for simple interpretation and comparison.

FINDINGS AND DISCUSSIONS

The impact of tannery effluents among rice growers were enumerated through various factors and also the results and findings are discussed below in Table 1.

Impact of Tannery Effluents on Paddy Growers

The impact of tannery effluents perceived by paddy farmers includes nine major components viz. crop nature, soil condition, water crisis, pest incidence, disease menace, economic fluctuations, social situation, health statuesque and psychological grief. The data on the overall perception of the impact of tannery effluents on paddy growers were collected, analyzed and presented in the Table 1.

Table 1: Distribution of Respondents Based on Their Overall Perception of Impact of Tannery Effluents on Paddy Growers (n=110)

Sl. No.	Category	Numbers	Percent
1	Low	17	15.50
2	Medium	74	67.30
3	High	19	17.30
		110	100.00

It is found from the above Table 1 that two-third (67.30%) of the farmers had a medium level of impact of tannery effluents followed by high level (17.30%) and low level (15.50%).

The probable reason for most of the respondents with medium level of impact might be because the effluents released from the tannery industries have deteriorated the ground water quality and made it unfit to use of agriculture as perceived by farmers. This led to a reduction in the area of paddy cultivation in the study area.

Crop Nature

Tannery effluents has a direct impact on the agricultural sector, human health and atmosphere. This situation when combines with adverse climatic events like drought will produce deleterious effects on agricultural crop. Hence, attempt was made to access the perceived possible impact of tannery effluents on crop nature.

Table 2: Impact of Tannery Effluents on Crop Nature (n=110)

Sl. No.	Crop Nature	Mean Score
1.	Change in cropping system	2.700
2.	Change in harvesting time	2.909
3.	Change in crop growing season	2.845
4.	Scorching of crops in transplanted paddy	2.772
5.	Crop destruction	2.445
Average Mean Score		2.734

It was found from the above table that the average mean score on the impact of tannery effluents on crop nature was worked out to be 2.734. The sub items like changes in harvesting time (2.909), growing season (2.845), scorching of crops (2.772), were found to be above the mean score. The other two items viz., change in cropping system (2.700), crop destruction (2.445) were found to have low scores compared to the mean score.

This is because the study area was more affected by less intense rainfall accompanied by untimely release of palar river water for paddy cultivation.

Hence, farmers were altering the cultivation operations so as to combat the effects of tannery effluents and unpredictable climate to some extent.

Soil Condition

Soil condition such as water holding capacity, salinity, humus content etc. influence the growth of the crop. The findings pertinent to the perceived impact of climate change on soil condition and were presented in the Table 3.

Table 3: Impact of Tannery Effluents on Soil Condition (n=110)

Sl. No.	Soil Condition	Mean Score
1.	Decreased soil water holding capacity	2.790
2.	Reduced soil nutrient content	2.700
3.	Increased soil salinity	2.281
4.	Soil erosion	2.018
5.	Accumulation of trash and debris	2.136
Average Mean Score		2.385

It could be seen from the above Table 3 that the average mean score was worked out to be 2.385. Decreased soil, water holding capacity, reduced soil nutrient content had a mean score of which is greater than the mean score with 2.790 and 2.700. And the other sub items such as increased soil salinity, soil erosion, accumulation of trash and debris have secured less mean score than the average mean score with 2.281, 2.018 and 2.136 respectively.

Hence, it could be concluded that the decrease in water holding capacity of soil and the reduced soil nutrient condition were the major impact of tannery effluents, on soil. The organic matter content in soil has got condensed due to effluents released from the nearby tannery industries which in turn lead to the reduction in soil water holding capacity and loss of natural soil nutrient.

Water Crisis

The rice growers' perception on the impact of tannery effluents on water resources was precise and the results had been presented in the Table 4.

Table 4: Impact of Tannery Effluents on Water Resources (n=110)

Sl. No.	Water Crisis	Mean Score
1.	Irrigation water shortage	2.863
2.	Depletion of water nutrients	2.818
3.	Increased water salinity	2.063
4.	Damaged agro wells	1.263
	Average Mean Score	2.252

It was evident from the Table 4 that the average mean score was found to be 2.252 where the sub items like declining of water nutrients, irrigation water shortage have mean score higher than the average a mean score with 2.863 and 2.818 respectively. The sub items like increased water salinity and damaged agro wells had a mean score less than the average mean score with 2.063 and 1.263 respectively.

The probable reason for the shortage of irrigation water was due to irregular release of water and less ground water potential in the study area.

Pest Incidence

The impact of tannery effluents on pest problems were considered and findings were presented in the Table 5.

Table 5: Impact of Tannery Effluents on Pest Incidence (n=110)

Sl. No.	Pest incidence	Mean score
1.	Leaf folder infestation	2.063
2.	Plant Hopper infestation	1.027
3.	Stem borer infestation	2.481
4.	Ear bug infestation	2.700
5.	Thrips infestation	1.009
6.	Arrival of new pests	1.181
7.	Leaf Hopper infestation	2.463
8.	Gall midge infestation	2.909
9.	Pest out break	2.845
10.	Rice mite infestation	1.172
	Average Mean Score	1.985

The findings presented in the Table 5 reveals that the average mean score was found to be 1.985 where stem borer infestation, leaf folder infestation, leaf hopper infestation, ear bug infestation, gall midge infestation, pest outbreak were found to be with high mean value than the average mean score with 2.481, 2.063, 2.463, 2.700, 2.909, 2.845 respectively. The other sub components like the arrival of new pests, rice mite infestation, thrips infestation, plant hopper infestation and had less mean score than the average mean score with 1.181, 1.172, 1.009, 1.027.

Drinking water and irrigation water were contaminated by the effluents released from tannery industries which has a major influence on the ecology of insects. This in turn results in the proliferation of more destructive pests and leads to reduction of crop yield.

Disease Menace

The impact of tannery effluents on disease menace had been analysed and presented in the Table 6.

Table 6: Impact of Tannery Effluents on Disease Menace (n=110)

Sl.No.	Disease Menace	Mean Score
1.	Sheath rot occurrence	2.127
2.	Leaf spot occurrence	1.018
3.	Sheath blight occurrence	2.654
4.	Blast occurrence	2.918
5.	Occurrence of new diseases	2.790
6.	Bacterial blight occurrence	2.727
7.	Disease outbreak	2.245
8.	Rice tungro disease occurrence	1.227
9.	False smut occurrence	1.000
Average Mean Score		2.078

From the Table 6 that the average mean score was found to be 2.078. Sheath blight occurrence and occurrence of sheath rot, blast occurrence, the occurrence of new diseases, occurrence of bacterial blight, disease outbreak had mean score higher than that of the average mean score, whereas the rice tungro disease occurrence, false smut occurrence, leaf spot occurrence had a mean score less than the average mean score of the impact of tannery effluents on disease menace.

Weather fluctuations like rise in temperature affects the pollination in paddy crop which results in poor grain setting. Further the fungal diseases were more common and can spread disease via spores carried by wind.

Economic Fluctuation

Use of contaminated water for rice cultivation had adversely effects on crop yields which in turn had reflected in the economic status of farmers. The findings on the impact of tannery effluent on the economic status of farmers was presented in the Table 7.

Table 7: Impact of Tannery Effluents on Economic Fluctuation (n=110)

Sl. No.	Economic Fluctuations	Mean Score
1.	Increased input cost	2.872
2.	Increased cost of cultivation	3.000
3.	Decreased annual income from rice crop	2.972
4.	Decreased crop yield	2.627
Average Mean Score		2.868

From the Table 7 it could be found that the average mean score was calculated to be 2.868, where the sub items like increased input cost, increased cost of cultivation, decreased annual income from rice crop had higher mean score value of 2.872, 3.000, 2.972. The other aspect like decreased crop yield had mean score value of 2.627 respectively, which was less than that of the average mean score.

Due to climate change the occurrence of pest and diseases has been drastically increased which led the increased application of pesticide and insecticides, which inturn added to cost of cultivation of the rice crop. This may be the reason for the adverse effects on the net profit of the farmers.

Social Situation

The impact of tannery effluents on the social situation of the rice growers in the study area was worked out and presented in the Table 8.

Table 8: Impact of Tannery Effluents on Social Situation (n=110)

Sl. No.	Social Situation	Mean Score
1.	Better relations developed with extension workers	1.827
2.	Migration	1.527
3.	Increased organizational participation	1.927
4.	Conflict	1.890
	Average Mean Score	1.739

From the above Table 8 it could be seen that the average mean score worked out to be was 1.739. The sub items like increased organizational participation and better relations developed with extension worker and conflict had a mean score value higher than that of the average mean score with 1.927, 1.827, 1.890 respectively whereas the mean score value for migration was less than the average mean score.

The probable reason for the increased organizational participation among the respondents is mainly to gain more knowledge on the scientific cultivation of crops to lessen the impact created by tannery effluents to build a better rapport with the extension workers mainly to get compensation for the crop loss if announced by the Government.

Health Statuesque

The results relevant to the impact of tannery effluents on health statuesque have been presented in the Table 9.

Table 9: Impact of Tannery Effluents on Health Statuesque (n=110)

Sl. No.	Health Statuesque	Mean Score
1.	Skin disease	1.000
2.	Respiratory disease	1.563
3.	Vector borne disease	2.009
4.	Diarrhoea	1.909
	Average Mean Score	1.620

From the above Table 9 it was found that the average mean score worked out to be 1.620. Of the various aspects of health statuesque, vector borne disease and diarrhoea had higher mean value of 2.009 and 1.909 respectively than the average mean value. The aspects with mean values less than that of the average mean value was found to be skin disease and respiratory disease with 1.563 and 1.000 respectively.

The tannery effluents adversely affect the health of the inhabitants which could be felt more among the rural vicinities with lack of awareness on the cause of the problems.

Psychological Grief

An attempt was made to measure the perception of rice growers on psychological grief and the results were presented in the Table 10.

Table 10: Impact of Tannery Effluents on Psychological Grief (n=110)

Sl. No.	Psychological Grief	Mean Score
1.	Anxiety and worry	2.900
2.	Depression	2.881
3.	Mourning	2.845
4.	Numbness	2.372
5.	Suicide attempt	2.045
6.	Apathy	1.081
	Average Mean Score	2.354

From the above Table 10 that the average mean score was calculated to be 2.354. Among the various issues, anxiety and worry, depression, mourning, the numbness had a mean value of 2.900, 2.881, 2.845 and 2.372 which was higher than the average mean score. The other issues related to psychological grief like apathy, suicide attempt had less mean score than the average mean score of psychological grief.

Due to frequent crop failure, yield reduction, farmers could not realize good returns and were unable to repay their debts. This might have created depression, anxiety and worry in them.

CONCLUSIONS

From the study, it could be concluded that tannery effluents have created many problems to the rice growers. Due to release of tannery effluents, the river water was more contaminated and became it unfit for drinking as well as irrigation purpose. Besides this, increased soil salinity, depletion of soil nutrients, frequent pest and disease outbreak, increased cost of cultivation were the impacts faced by the paddy farmers. Simultaneously, the economic fluctuations and the stress level of farmers had also drastically increased. So, to overcome these effects Government has to take necessary measures to ensure proper execution of existing policies for the betterment of farmers.

REFERENCES

1. Balakrishnan, M., 2008. *Impact of Dyeing Industrial Effluents on the Groundwater Quality in Kancheepuram (India)*.
2. Madhav, R. 2008. *Tirupur Water Supply and Sanitation Project – An Impediment to Sustainable Water Management. Working Paper, International Environmental Law Research Centre, Geneva, Switzerland.*
3. Rk, G., Javeria, S., Yadav, K., Tyagi, S., & Singh, R. (2015). *Survey and surveillance of major insect-pests of basmati rice in western Uttar Pradesh (India)*. *International Journal of Research in Applied, Natural and Social Sciences*, 3(3), 1-8.
4. Karthikeyan, C. 2009. *Farmer's Willingness to Pay for Irrigation Water: A Case of Tank Irrigation Systems in South India*. *Water*, 1:5-18.
5. Phan Thanh Dinh, Nguyen Thi Phuong Chau & Le Thanh Hoa (2017). *Water Irrigation of Coffee Farmers in Dak Nong Province, Central Highland of Vietnam*. *International Journal of Agricultural Science and Research (IJASR)*, 7(3), 83-92

